

LEAPS-INNOV

APPLE X Prototype Status

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May 9th, 2023 at the IPAC23 x LEAPS-
INNOV satellite event



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101004728

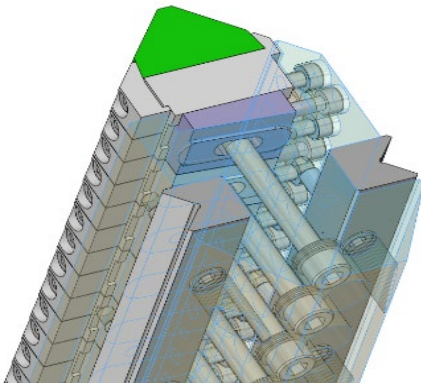


LEAPS

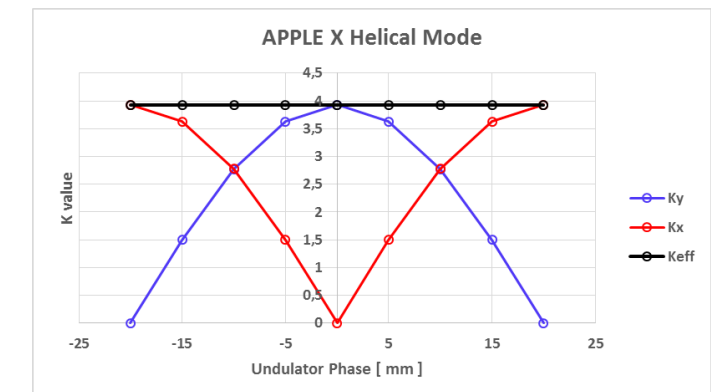
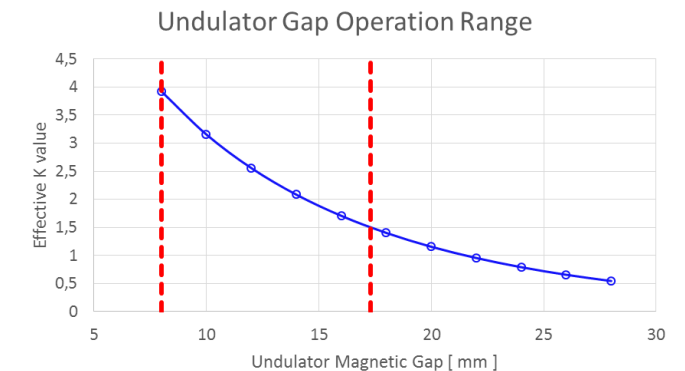
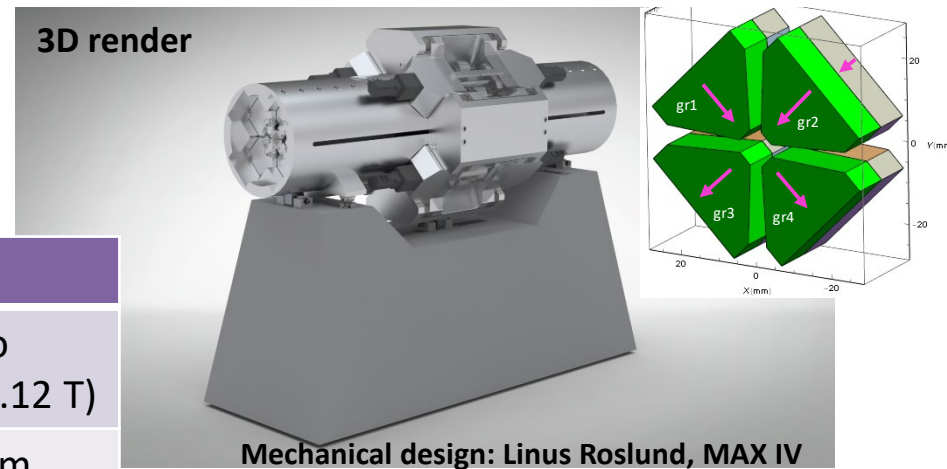
League of European
Accelerator-based
Photon Sources

Key Elements

- Compact and light-weight
- Independent gap and phase adjustment
- Shimmable magnets in assembled state
- Full polarization control
- Possibility to create field gradients
- Radial gap operation (K tuning)
- fixed gap operation (field neutralization)

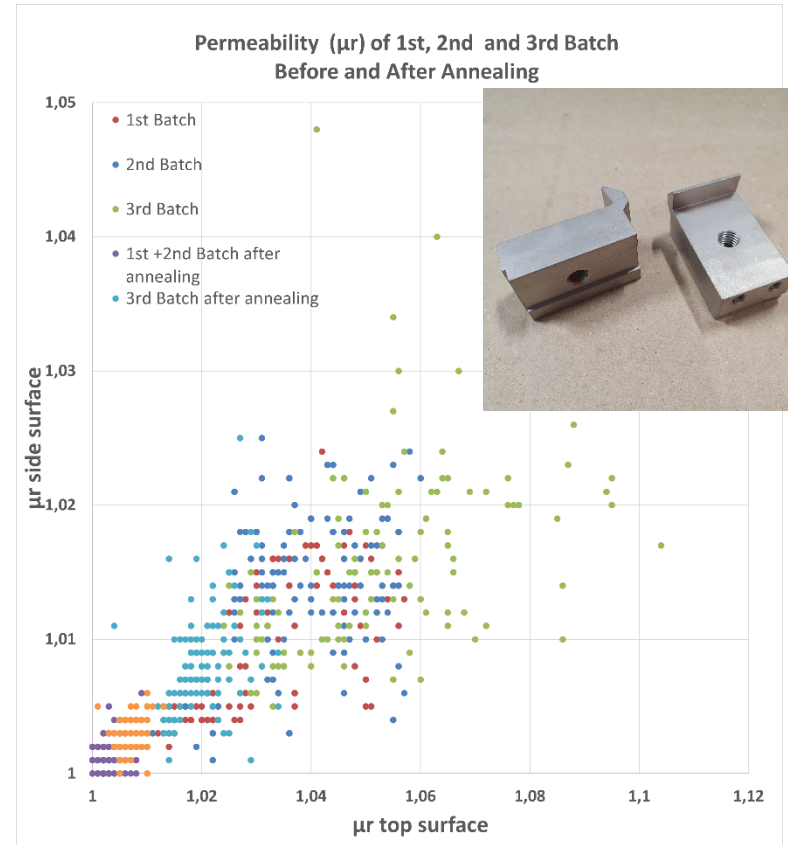
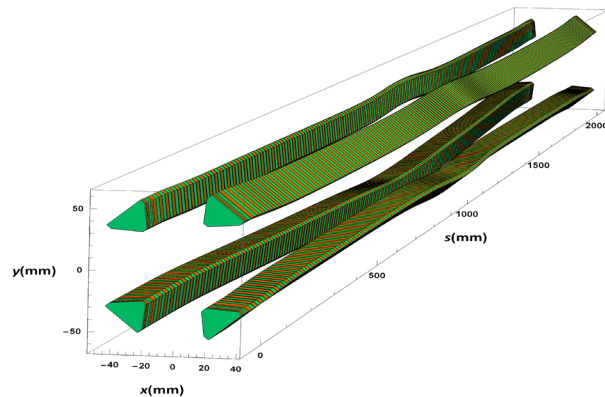


| Magnet type | SmCo ($B_r=1.12$ T) |
|---------------------------|-------------------------|
| Period Length | 40 mm |
| Magnetic gap range | 8.0 – 17.3 mm |
| Effective K range | 3.9 – 1.51 |
| Max. gap / min. eff. K | 28 mm / 0.55 |
| Undulator magnetic length | 2 m |
| Weight | < 2 tons |



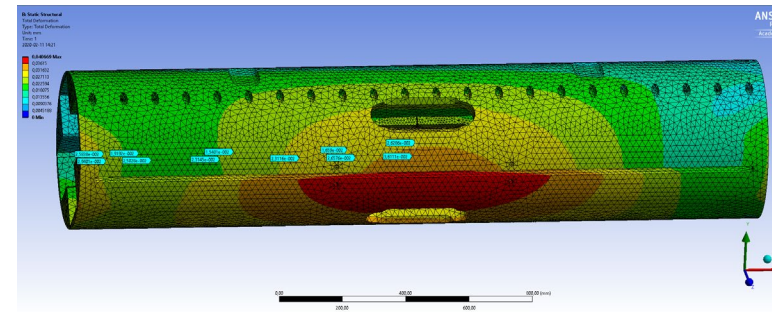
Industrial Opportunities

- Opportunity to increase product portfolios
- Production-ready blueprint; no R&D required from industry -> knowledge transfer
- Readily available and light materials
- No heavy frames needed & table-top size
- Flexible in control integration (e.g. PLC, ICEPAP)
- Multiple applications (FELs & rings)



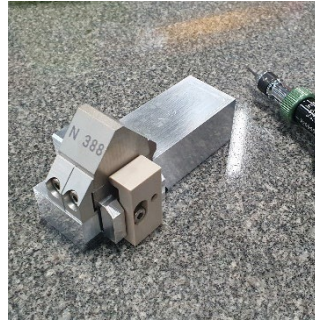
In-house R&D include

- Magnetic force analysis & mechanical deformation
- Material- and production testing (low-permeability materials)
- Development of improved magnetic measurement approaches -> will potentially feed back into design re-iterations



Project Status

- Entered assembly phase
- Most parts have arrived
- Simultaneous documentation of assembly steps
- "lessons learned" document for potential future design revisions; tolerance revisions
- parallel magnetic measurements with hall-probe bench and pulsed-wire system



Magnet mounting on holders (400 pcs); 100 mounted



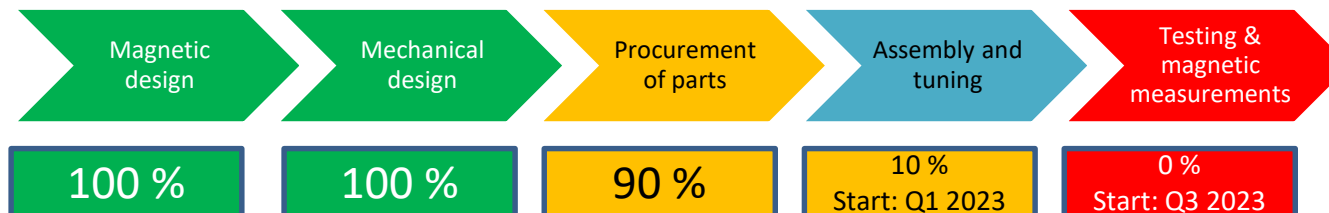
Assembly of motion unit



Measurement bench preparation



Strongback in machining, first half complete





*“Foster open innovation for
accelerator-based lightsources in
Europe”*

<https://leaps-initiative.eu>



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